Powers (C.A.) & White (G.R.)

Excision of the Larynx

SIX CASES HITHERTO UNREPORTED, TOGETHER WITH THE ANALYSIS OF THREE HUNDRED ADDITIONAL CASES GATHERED FROM LITERATURE

BY

CHARLES A. POWERS, M.D.

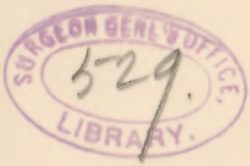
DENVER, COL.

AND

GEORGE R. WHITE, M.D.

NEW YORK

Reprinted from the MEDICAL RECORD, *March* 23, 1895



NEW YORK

TROW DIRECTORY, PRINTING AND BOOKBINDING CO.

201–213 EAST TWELFTH STREET

1895

Excision of the Larynx

SIX CASES HITHERTO UNREPORTED, TOGETHER WITH THE ANALYSIS OF THREE HUNDRED ADDITIONAL CASES GATHERED FROM LITERATURE

BY

CHARLES A. POWERS, M.D.

DENVER, COL.

AND

GEORGE R. WHITE, M.D.

NEW YORK

Reprinted from the MEDICAL RECORD, *March* 23, 1895

NEW YORK

TROW DIRECTORY, PRINTING AND BOOKBINDING CO.

201–213 EAST TWELFTH STREET

1895

EXCISION OF THE LARYNX.

SINCE the first operation by Watson, in 1866, total or partial extirpation of the larynx has been performed upward of three hundred times. It has been the subject of exhaustive study at the hands of many observers. In earlier years by Schierer,[1] Baratoux,[2] Salamoni,[3] Mackenzie,[4] and Solis-Cohen;[5] recently by Pinçonnat,[6] Kraus,[7] Taube,[8] and Wassermann.[9] It has found its chief indication in carcinoma, but in scattered instances has been employed in sarcoma, polypi, tuberculosis, enchondroma, stenosis, and necrosis. Of all reported cases a little over two-thirds have been complete.

In the provisional choice of operation, one is to be guided largely by the results of endo-laryngeal examination; but whatever the procedure chosen, preliminary tracheotomy is a prerequisite. In this nearly all authors agree, and it is interesting to note that of the 171 total excisions collected by Pinçonnat it was omitted in but 8. Its advantages are that the lungs become accustomed to the new manner of breathing,

[1] Deutsche med. Wochenschr., June, 1888.
[2] Le Progrès Médicale, June, 1888.
[3] Extirpazione della Larynge. Cremona, 1886.
[4] Frederick the Noble, 1888.
[5] Encyclopédie international de chirurgie. Paris, 1886.
[6] De l'extirpation du Larynx. Paris, 1890.
[7] Allegemeine Wiener med. Zeitung, 1890.
[8] Centralblatt f. Chir., No. xix., 1892.
[9] Archiv f. klin. Chirurgie, Bd. xli.

that the trachea becomes fixed to the anterior wall of the neck, and that time is saved when doing the larger operation. The tracheotomy should be made well below the isthmus of the thyroid gland, and the tube inserted should be of large calibre. The laryngectomy may follow the tracheotomy in from three to fifteen days. During the operation of excision the greatest precaution should be taken to prevent fluid from passing down the trachea into the bronchi. Safety in this is effected by numerous devices, of which the tampon cannula of Trendelenburg, or some modification of it, is most in favor. Many operators have relied on occlusion of the trachea above the tube by distended rubber balloon, sponges, or gauze packing. Whatever the method adopted, the greatest care should be taken to render it effectual, entrance of blood to the lungs being exceedingly liable to occasion a fatal pneumonia.

In the total excision the patient lies on the back with a pillow under the shoulders, the head being a little dependent. An incision is made in the median line from the hyoid bone to a point a little below the cricoid cartilage, and a transverse incision over the hyoid bone meets this at its upper end. On exposing the larynx the sterno-hyoid muscles are drawn to one side and severed close to their insertion. The soft parts are bluntly dissected from the larynx. Vessels are ligated as encountered. After the sides of the larynx become free, the inferior constrictor of the pharynx is to be cut close to its insertion into the thyroid cartilage. The trachea is next cut across, just below the cricoid, and drawn forward, while its lumen is well packed with sponges or iodoform gauze. The larynx is bluntly dissected from the deeper parts, until the upper corners of the thyroid are freed. Finally, the thyro-hyoid membrane is cut across and the larynx removed. The epiglottis is removed or left in place ac-

cording to its condition. If it is desirable to see the inside of the larynx before removing it, the thyroid can be split down the middle and the sides held apart, while the upper end of the trachea is packed with sponges or gauze. The organ can then be removed piecemeal.

The partial operation is usually performed by splitting the thyroid down the middle, packing the upper end of the trachea, and then removing as much of the larynx as is desirable.

After the operation the upper end of the trachea is packed firmly with gauze to prevent blood and saliva from flowing into it, and the rest of the wound stuffed lightly with an antiseptic gauze. Bardenheuer,[1] Solis-Cohen,[2] and others attempt to prevent foreign material from entering the lungs by elevating the foot of the bed. Nutritive enemata are given for the first forty-eight hours, then a stomach-tube may be passed through the wound into the œsophagus and gastric feeding begun. The packing is removed from the wound as often as necessary, and the parts washed with a weak antiseptic solution.

Breathing is maintained through the tracheal-tube for the first three or four weeks; an artificial larynx may then be inserted. The first apparatus of this kind was invented by Gussenbauer for Billroth's original case in 1872, and some modification of it is still in use.

In June, 1893, Hans Schmidt[3] exhibited a patient in whom there was no communication between the mouth and the trachea, in spite of which fact a fairly good voice had returned about a year after operation. Examinations by Helmholz, Landois, Fränkel, and others showed that the upper part of the œsophagus served

[1] Deutsche med. Wochenschrift, Bd. xix.
[2] New York Medical Journal, vol. lvi.
[3] Ber. klin. Wochenschr., 1893.

as a receptacle for air, which put in motion some bands of mucous membrane at the base of the tongue. Solis-Cohen,[1] Carmalt,[2] and others have shown similar cases, and it is believed that by systematic practice a considerable number of these patients will recover their voice to a greater or less extent, without the aid of the artificial larynx.

The most frequent cause of death after the operation is pneumonia; it is due to blood or septic material entering the bronchi. In a certain number of cases fatal heart failure comes on four or five days after the operation. The cause of this has been exhaustively studied by Grossmann,[3] who thinks it due to irritation of the superior laryngeal nerve by contraction of the scar. Experiments on dogs show that stimulation of this nerve always increases the blood-pressure, and in a certain number of cases renders the left ventricle insufficient, so that pressure in the pulmonary vein is increased and the lungs are congested, as shown by their increase in size. This stimulation, continued for a considerable length of time, can cause profound disturbance of the function of the heart, and finally complete cessation of its action.

The following six cases of excision of the larynx are here reported in full for the first time. One only, the first, was done by me (C. A. P.). The remaining five were observed by me in the practice of Dr. W. T. Bull, to whom grateful acknowledgment is herewith made for permission to publish.

Case I. *Partial Laryngectomy for Cancer—Death from Recurrence at End of Five Months.*—F. H——,[4] male, aged fifty-four, was referred to me by Dr.

[1] New York Medical Journal, 1893.

[2] Transactions of Third Congress of Physicians and Surgeons, Washington, 1894.

[3] Wien. med. Presse, 1892.

[4] This case was shown before the Section on Laryngology, New York Academy of Medicine, in 1892.

George A. Richards, December 28, 1891. His general health had always been good. He was a machinist, and had worked at his trade, mostly in brass-work, since boyhood. He had never suffered from syphilis nor been given to alcoholic or other excesses. He had never had more than a transient trouble in his throat until May, 1891, at which time he began to suffer with a persistent hoarseness and irritation. For a time he was unable to speak aloud, but later regained his voice. Expectoration was troublesome, and at times profuse. There was occasional pain in the throat, extending thence to the right side of the neck and head. When first seen by Dr. Richards there was a small oval mass on the right side of the larynx, between the cords. To exclude syphilis, potassium iodide was given in considerable doses. Under its use iodism developed and the tumor increased in size. The patient was examined by Drs. Lefferts and Delavan, who agreed with Dr. Richards in the diagnosis of cancer and advised extirpation. He was admitted to the New York Cancer Hospital, January 2, 1892. A preliminary tracheotomy was done well below the isthmus of the thyroid, and a long tracheal tube of large calibre inserted. This occasioned no reaction, and the patient was up and about on the third day. He breathed freely through the tube, but the irritation in the larynx increased and caused much discomfort at night. On January 13th, eleven days after the tracheotomy, the right half of the larynx was excised in the following manner: Chloroform being administered through the tracheal tube, an incision was made in the median line from the hyoid bone to a point three-fourths of an inch below the cricoid cartilage. The soft parts over the thyroid cartilage were somewhat thickened and infiltrated. The upper notch of the thyroid was defined, an angular scissors entered at the crico-thyroid space, and the thyroid cut in the median line from below up-

ward. At this first cut the cavity of the larynx was not entered, and as it was thought possible that the incision might be somewhat lateral, an additional cut was made on its left. It was found that the growth passed beyond the median line and thus occasioned deception. The two halves of the larynx were held widely apart with retractors and the trachea immediately stuffed with small sponges to the level of the tube.

Examination of the larynx showed a soft, grayish mass with segregated surface ulcerations, which extended from the upper to the lower border of the right thyroid wing, passing somewhat beyond the median line anteriorly, and at the centre bulging well toward the opposite side. A transverse cut was made above, outward to the edge of the sterno-mastoid, and the soft parts dissected from the outer surface of the thyroid cartilage. The thyro-hyoid membrane was cut across and the right half of the larynx easily removed, the pharynx being opened anteriorly and above. The right half of the cricoid was also taken away, together with the anterior portion, about one-fifth, of the left half of the thyroid. The left vocal cord was reddened, but the tissues seemed free from infiltration. Hemorrhage was checked, the wound washed with Thiersch's solution, and mopped out with a one-fiftieth per cent. sublimate solution. The sponges were removed from the trachea and a rubber balloon inserted and inflated, iodoform gauze being packed pretty tightly above it. The balloon had a diameter a little larger than the lumen of the trachea, and when blown up seemed to occlude the tube admirably. The rest of the cavity was packed firmly with iodoform gauze. The patient recovered rapidly from the chloroform, and showed no signs of shock. Rectal feeding was commenced early and carried out in the usual way. The outer dressings were quickly stained from oozing, and were changed at frequent intervals. The mouth was kept clean by constant washing with boric-acid solution. During the

night a small amount of clotted blood was coughed through the tracheal tube. The temperature and pulse during the next five days were but little above the normal, the enemata were well retained, and the patient was comfortable. On the fourth day the gauze was removed, a soft rubber catheter passed through the wound into the œsophagus, and stomach-feeding with peptonized milk and whiskey commenced. On the fifth day the patient expelled a very considerable amount of blood through the tracheal tube. The temperature ranged from 100° F. to 104° F., the pulse ran up to 120, and septic bronchitis was feared. Physical examination of the lungs gave negative results.

These unpleasant symptoms gradually subsided, but unmistakable signs of iodoform poisoning were seen. The dressing was removed and gauze wet in Thiersch's solution was substituted.

On the eleventh day a severe secondary hemorrhage took place. This was promply checked by the house surgeon.

On the fourteenth day an œsophageal tube was passed through the mouth and left in place. At the end of the third week he was able to swallow soft food. An artificial larynx, a modification of Gussenbauer's, was inserted, and the opening in the trachea allowed to close. The apparatus proved satisfactory. The wound contracted upon it, and with its obturator in place the patient was able to swallow without difficulty. He could speak in a hoarse monotone, which was quite intelligible to those near by. The tube was of large calibre and the ingress and egress of air were ample.

The patient returned to his home, but a recurrence of the growth took place, and he died five months after the operation.

Report of the hospital pathologist, Dr. Coleman: "Epithelioma."

The remaining five operations were performed, as said, by Dr. Bull.

Case II. *Total Laryngectomy for Cancer—Death at End of one Year.*—W. W——, aged sixty-two, engineer. June 17, 1887. About a year and a half ago began to lose his voice. Ten days ago began to have difficulty in breathing.

Examination by Dr. Beverley Robinson: Two cauliflower-like excrescences on the right side of the larynx, the superior taking its origin from the ventricular band, protrudes into the larynx, filling nearly half of the lumen. The lower growth is below the vocal cord and occludes the larynx to a greater extent than does the upper.

Tracheotomy under cocaine.

Endo-laryngeal Operation.—June 18th. Incision in the median line down to the thyroid cartilage, which was divided with a heavy scissors. In addition to the two growths above described another was found on the left side just below the vocal cord. The growths were removed with a Volkmann spoon and the bases touched with a saturated solution of chromic acid. The cartilage was united with a silver-wire suture and the superficial parts closed with catgut. Uneventful recovery. The tube was removed on the fifth day, and the patient left the hospital relieved of dyspnœa.

Pathologist's report shows both growths to be epithelioma, cells of the small flat variety.

July 26th.—Dyspnœa and loss of voice. Tracheotomy under cocaine.

Total Laryngectomy.—August 3d. The patient was placed on his back with his head slightly dependent. An incision was made in the median line from just above the hyoid bone to the tracheotomy wound, and a transverse incision along the hyoid bone. The edges of the wound were retracted and the muscles peeled from the thyroid cartilage with a periosteal elevator. The thyroid was split in the median line without going through the mucous membrane, and the soft parts separated from the inside of the cartilage, which

was then taken out in pieces. The larynx was opened by an incision from the hyoid bone to the cricoid cartilage, and the lumen of the trachea above the cannula filled with sponges and iodoform gauze. The growth was now examined and found to extend from the apex of the right arytenoid forward and to the right as far as the median line in front; downward as far as the base of the arytenoid, and to the left as far as the middle of the cricoid. There was another deposit half an inch in diameter about the insertion of the true cord. The cricoid was divided in the median line and its external attachments dissected off, then split posteriorly, and detached from the anterior wall of the pharynx, together with the parts of the larynx above it. The thyro-hyoid membrane was cut close to its lower attachment and the entire larynx removed. The lumen of the trachea was plugged with iodoform gauze above the Trendelenburg cannula, and some lamp-wicking placed above this, the rest of the wound being lightly packed with iodoform gauze. A loop of silk was passed through the anterior wall of the pharynx to facilitate the passage of the stomach-tube; sutures to the transverse wound; nutrient enemata for the first twenty-four hours; afterward feeding by stomach-tube.

Uneventful recovery. Death from recurrence about a year later.

Case III. *Partial Laryngectomy for Cancer — Death in Fourteen Months.* — J. D——, male, aged fifty-one. March 20, 1888. Four months before admission to the New York Hospital the throat became sore; no cough, no dyspnœa, but slight pain on swallowing. Three weeks ago hoarseness and slight laryngeal cough. Dyspnœa during last two weeks. Upon admission the patient had extreme dyspnœa and a moderate degree of cyanosis.

Examination: The parts about the base of the tongue are somewhat tumefied and congested. The

apex of the epiglottis is pushed to the left by a growth which involves its inner surface, and extends downward and to the right as far as can be seen. There is but a very narrow slit between the growth and the opposite half of the larynx. There is a distinct enlargement of the glands on the right side of the jaw. A low tracheotomy was performed under cocaine to relieve the urgent dyspnœa.

Partial Laryngectomy.—March 31, 1888. The tracheal tube was packed about with sponges to prevent blood from entering the trachea. A vertical incision was made from the hyoid bone to a point just above the tracheotomy wound. The thyroid cartilage was split in the median line and the sides held apart by retractors, exposing the growth, which was found to involve the right side only and extend as far down as the base of the arytenoid. The epiglottis was drawn down by a hook and found to be involved. The left half of the larynx, together with the epiglottis and part of the wall of the pharynx, were removed and the wound packed with iodoform gauze. Condition of patient during and after the operation was excellent.

Feeding by stomach from the first day. Uneventful recovery. Death from recurrence in fourteen months. Pathological diagnosis: "Epithelioma."

Case IV. *Partial Laryngectomy for Sarcoma—Well at End of Four Years.*—L. R——, aged forty-three, female. The patient first came under observation April 5, 1888, at which time she complained of hoarseness of several months' standing.

Examination showed tumefaction of left ventricular band with degeneration of left true vocal cord. Mucous membrane high colored on the left side.

June 26, 1888.—Tracheotomy under chloroform, and a long silver tube inserted.

Partial Laryngectomy.—July 4, 1888. Head dependent. Incision from half an inch above hyoid bone to half an inch above tracheotomy wound. The larynx

was split its entire length, and the upper end of the trachea was packed with sponges. The vocal cords appeared normal, but in the left ventricle and false vocal cord there was evident thickening, but no sharply defined tumor. A section of the ventricular band was removed, and after freezing, sectioning, and staining was found to contain inflammatory tissue only. The mucous membrane was normal. In view of the fact that the larynx had been the seat of a tumor for some weeks, which had been slowly increasing in size, it was thought best to excise all of the suspicious area. Between the true and false vocal cords a small mass of tissue was found about the size of three peas; this appeared to be attached to the cartilage. A section of this was rapidly prepared by Dr F. Ferguson, and gave evidence of being a small, round-celled sarcoma. Half of the larynx was removed with scissors, leaving behind the superior cornu of the thyroid. The wound was irrigated and packed with bismuth gauze. The upper angle was closed by two catgut sutures. The operation lasted two hours, a half of which time was spent in microscopical diagnosis. Uneventful recovery. Full pathological report lost. **Patient well four years later.**

Case V. *Total Laryngectomy for Cancer—Death from Recurrence at Two and One-half Months.*—J. L.——, aged forty-four, male. Family and personal history good. Four months ago the patient began to have dyspnœa and dyspepsia. Two months ago tracheotomy was performed to prevent suffocation. He has worn the tube since. It has occasioned no trouble.

Examination by Dr. D. B. Delavan shows a large growth filling the upper part of the larynx, apparently attached on the right side and extending well over the median line. It is impossible to demonstrate where the growth is attached to the laryngeal walls, as they cannot be seen below the level of the top of the arytenoid cartilages. The depth of the tumor cannot be estimated. The epiglottis is fixed, showing no move-

ment. Its shape, however, is normal. There is much congestion and some infiltration of the adjacent sides of the pharynx. The surface of the tumor is irregular and nodular. The mucous membrane is deeply congested.

Total Laryngectomy.—Operation : April 18, 1888. An incision was made in the median line, from the upper part of the hyoid bone to a point just above the tracheotomy wound, and a transverse incision along the hyoid joining the upper end of the first.

The soft parts were dissected from the larynx with periosteal elevator and the larynx split its whole length in the median line. The sides were held apart and taken out piecemeal until the cartilages and all the growth were removed. The epiglottis was left intact. The transverse incision and half of the vertical one were sutured with catgut, and the rest of the wound packed with iodoform gauze. The patient recovered well from the anæsthetic. He was given nutrient enemata the first thirty-six hours, after which he was fed by a stomach-tube.

May 2d.—Patient up and walking about.

May 11th.—The lower angle of the wound was enlarged with a cautery and a long tube inserted into the trachea through the wound.

The patient continued to do well until June 15th, when a small nodular mass was found at the right of the tracheal opening, adherent to the skin and mucous membrane. Examination showed the growth to be too extensive for removal.

June 27th.—The growth is the size of a goose-egg, and extends from the hyoid bone half way to the sternum. On the left side the skin is thickened, indurated, and firmly adherent. Induration reaches to the sternum.

June 30, 1888.—Patient died of hemorrhage from the growth.

Pathological diagnosis : " Epithelioma."

Case VI. *Partial Laryngectomy for Cancer—Death from Operation.*—J. V——, aged sixty-eight, male, New York Hospital. Family and personal history good. For a long time has had transient hoarseness on taking cold. Two years ago subsidence did not occur, a tumor was discovered by a laryngologist and pronounced benign. Hoarseness was the only symptom until three months ago, at which time dyspnœa was experienced.

Examination: A reddish gray tumor is seen growing from the right vocal cord. No ulceration. No enlarged cervical glands.

Partial Laryngectomy.—November 10, 1890. A median incision three and one-half inches long was made, the lower extremity being opposite the third tracheal ring. Tracheal cannula inserted. Thyroid opened, disclosing a tumor involving the right vocal cord and the mucous membrane above and below it. The right half of the thyroid and right arytenoid were removed, leaving the superior cornu of the thyroid. The wound was packed with iodoform gauze.

The patient developed septic pneumonia and died the fourth day after the operation.

Pathologist's report: "Epithelioma."

In considering the question of result, immediate and remote, after laryngectomy, the writers have compiled statistics in all of the cases to which they have been able to gain access. They have taken as a groundwork the admirable article of Eugene Kraus,[1] who, in 1890, collected and carefully analyzed all of the cases which were accessible to him. Of these there are 240. The writers are able to add 69 cases, making a total of 309. The cases collected by them are appended to this article (Table C). Statistics of the entire number of cases are found in the following table (A):

[1] Allg. Wien. med. Zeitung, Bd. 35, p. 169.

TABLE A.—TOTAL EXTIRPATION OF LARYNX.

	Kraus.	The Authors	Total.
Number of cases	160	48	208
Carcinoma	142	43	185
Sarcoma	9	2	11
Tuberculosis	3	1	4
Other causes	6	2	8
Died as result of operation (8 weeks).	59	14	73
Recovered from operation "	101	34	135
Died within 6 months	36	15	51
" between 6 months and 1 year.	21	3	24
" " 1 year and 2 years.	8	2	10
" " 2 years and 3 years.	6	2	8
Survived 3 years or more	13	2	15
Not traced, or reported too early.	17	10	27

PARTIAL EXCISION OF LARYNX.

Number of cases	80	21	101
Carcinoma	66	16	82
Sarcoma	2	2	4
Tuberculosis	2	1	3
Other causes	10	2	12
Died as result of operati n (8 weeks)	20	8	28
Recovered from operation "	60	13	73
Died within 6 months	18	4	22
" between 6 months and 1 year.	5	3	8
" " 1 year and 2 years.	5	1	6
" " 2 years and 3 years	3	0	3
Survived 3 years or more	7	1	8
Not traced or reported too early.	22	4	26

Of the 309 operations 101, or thirty-two per cent., of the patients succumbed to the operative procedure—died within the first eight weeks from shock, hemorrhage, pneumonia, septic infection, or exhaustion. The mortality was considerably greater in the total operation than in the partial, it being thirty-five per cent. in the former as against twenty-seven plus per cent. in the latter.

The mortality is, then, an important factor in weigh-

ing the matter of operation. That it must vary materially, and must be dependent to a not inconsiderable degree on the general condition of the patient, the nature and stage of the disease, and, indeed, on the surgeon, may well be thought. Unfortunately, we are unable to analyze and estimate these factors, and are forced to accept the figures as a totality.

The cases collected by the authors (late cases) show a decrease in the death-ratio in the total excisions: twenty-nine plus per cent. as against thirty-six per cent. in the Kraus tables; while the mortality in the partial operation is, on the other hand, markedly increased: thirty-eight per cent. as opposed to twenty-five per cent.

The fact that such a large percentage of the operators have had but a single case may possibly be accepted as contributory to an explanation of the high death-rate, and it is but fair to assume that more careful selection of cases, early operation, and a constantly improving technique will tend to diminish the mortality. For the present, however, we shall doubtless be unable to remove laryngectomy from the list of very serious operative procedures.

When we consider the question of ultimate results in the malignant cases we find the statistics very unsatisfactory. Cases which are to be of value should be traced to the end. Assuming, in common with other observers, that three years is a fairly safe limit, the cases should be divided into two classes: first, those prior to three years ago, and second, those done within the last three years.

In the following table (B) an exhibit is made of the laryngectomies done for carcinoma prior to January 1, 1892:

TABLE B.—CARCINOMA.

1. *Total Excision of Larynx.*

Cases reported prior to January, 1892	180
Died as result of operation (8 weeks)	72
Died in first year, 5 from recurrence	8

TABLE B.—CARCINOMA (*Continued.*

Recurred in first year, either dead or still living when reported	51
Recurred after one year [13 months (2); 2 years (2); 2 years, 1 month; 2 years, 7 months; 3 years, 4 months; 9 years]	8
Reported in first year—free	16
Reported in second year—free	11
Reported in third year—free	3
Reported after three years—free	11

2. *Partial Excision of Larynx.*

Cases reported prior to January, 1892	77
Died as result of operation (8 weeks)	26
Died in first three years (3 from recurrence)	5
Recurrence in first year, either dead or still living when reported	17
Recurrence after one year [13 months; 16 months; 17 months]	3
Reported in first year—free	13
Reported in second year—free	4
Reported in third year—free	2
Reported after three years—free	7

Total Laryngectomy for Cancer. (Table B, 1.)—It is seen that of the 180 cases, 72, or forty per cent., died as the direct result of the operation itself. Of the remaining 108 cases, 51, or nearly one-half, had recurrence during the first year; and 11, or ten plus per cent., of the survivors were free from relapse three or more years after operation. These cases were as follows:

Operators: Bergmann, 3 years; Stoerck, 3 years, 3 months; Winiwarter, 3 years, 4 months; Fischer, 3 years, 6 months; Gottstein, 3 years, 6 months; Camponotto, 3 years, 6 months; Thiersch, 3 years, 7 months; Schede, 4 years, 6 months; Gussenbauer, 6 years; Gussenbauer, 6 years; Gussenbauer, 8 years (patient died of pleurisy).

Of the remaining cases, 8 died during the first year, without recurrence; 8 suffered relapse at a period varying from thirteen months to nine years; while the other 25 are reported before the lapse of three years, but are noted as "free"—16 in the first year, 11 in the second, and 3 in the third.[1]

[1] Of these, one, the famous case of Solis-Cohen, may now be added to the list of those past the three-year limit.

Table C.—Total Extirpation of Larynx.

Cases Collected by the Writers.

No.	Surgeon.	Date.		Sex and Age.	Diagnosis.	Parts Removed.	Course.	Source.
1	Mikulicz		1886		Carcinoma	Larynx	Recurrence, died several months	1 Schwartz, Tumeurs du Larynx. Paris
2	Mikulicz		1886.		Carcinoma	Larynx	Recovery	1 Personal communication to Solis
3	Koehler	Jan.,	1887	M. 53	Carcinoma	Larynx, pharynx	Died, 2 days.	Arch. f. kl. Chir., Bd. XLIV., 1892.
4	Brandeis	Feb.,	1887	M. ?	Carcinoma	Larynx, pharynx.	Pneumonia, died 4 days.	Transactions of the Medico-Chirurgical Faculty of Maryland, 1888.
5	Roux	April	1887	F. 61	Carcinoma	Larynx, pharynx, and glands	Recurrence, after 4 months.	Rev. Méd. de la Suisse Romande, 1888.
6	Bull	Aug.,	1887	M. 60	Carcinoma	Larynx.	Recurrence, died 1 year.	Records of the New York Hospital, 1890.
7	Wyeth		1888	M.	Endothelioma	Larynx.	Died, few hours.	Records of St. Mary's Hospital, Brooklyn, 1890.
8	Bull	April	1888	M. 40	Carcinoma	Larynx, not epiglottis.	Recurrence, died 1 year.	Records of the New York Hospital, 1890.
9	Fowler	Nov.,	1888.	M. 50	Carcinoma	Larynx	Recurrence, died 2 years.	American Journal of the Medical Sciences, October, 1889.
10	Caporotto		1889	M. 42	Carcinoma	Larynx.	Well, 3 years.	Centralblatt f. Chir., Bd. XIX., 1892.
11	Ombrin		1889	M. 63	Carcinoma	Larynx.	Recovery	Centralblatt f. Chir., Bd. XIX., 1892.
12	Terrier	July.	1889	M. 50	Carcinoma	Larynx.	Recurrence, died 5 months.	Bull. and Mém. de la Soc. de Chir., Paris. March, 1892.
13	Poulsen	Oct.,	1889	M. 56	Carcinoma	Larynx, pharynx.	Pneumonia, died 7 weeks.	Centralblatt f. Chir., No. 1, 1891.
14	Demons		1890	M.	Carcinoma	Larynx	Died, few hours	Jour. de Méd. de Bordeaux, July, 1890
15	Fowler		1890	M. 46	Carcinoma	Larynx.	Recurrence, after 4 months.	Annual Report of the Methodist Episcopal Hospital, Brooklyn, 1890.
16	Perier	March,	1890	M. 66.	Carcinoma	Larynx.	Died, few hours.	Jour. de Méd. de Bordeaux, June, 1890
17	Koehler	Jan.,	1891	M. 71.	Carcinoma	Larynx.	Well, 9 months	Arch. f. kl. Chir., Bd. XLIV., 1892.
18	Koehler	Jan.,	1892	M. 51.	Carcinoma	Larynx.	Recurrence, 6 mo.	Arch. f. kl. Chir., Bd. XLIV., 1892.
19	Bull	Aug.,	1890	M. 50	Carcinoma	Larynx	Pneumonia, died 4 days	Records of the New York Hospital, 1890.

TABLE C.—TOTAL EXTIRPATION OF LARYNX (*Continued*).

No.	Surgeon.	Date.	Sex and Age.	Diagnosis.	Parts Removed.	Course.	Source.
20	Meyer.....	Nov., 1880.	M. 65.	Carcinoma.	Larynx.	Recurrence, died 6 months.	New York Medical Journal, vol. xlviii., 1891.
21	McLeod....	Jan., 1891.	M. 28.	Carcinoma.	Larynx and glands.	Well, 47 days.	India Medical Gazette, 1891.
22	Hochenegg.	June, 1891.	M. 51.	Carcinoma.	Larynx.	Well, 5 months.	Wien. kl. Wochenschrift, Bd. V., 1892.
23	Wolf	Oct., 1891.	M. 41.	Carcinoma.	Larynx.	Well, 8 months.	Berlin. kl. Wochenschrift, Bd. XXI., 1892.
24	Cohen.....	Jan. 1892.	M. 41.	Adeno-carcinoma.	Larynx.	Well, 2 years.	New York Medical Journal, vol. lvi., 1894.
25	Bond	Sept., 1892.	M. 46.	Myxo-chondroma.	Larynx.	Well 7 months.	Lancet, vol. i., 1893.
26	Jaennel	Nov., 1892.	M. 63.	Chronic laryngitis.	Larynx.	Well, 2 months.	Arch. prov. de Chir., VII., 1893.
27	Abbe.....	Nov., 1892.	M. 65.	Carcinoma.	Larynx.	Recurrence, died 3 months.	Records of St. Luke's Hospital, New York, 1892.
28	Gerster.....	Feb., 1893.	M. 42.	Carcinoma.	Larynx.	Heart failure, died 11 days.	Records of Mt. Sinai Hospital, New York, 1893.
29	Crele	1883.	M. 56.	Carcinoma.	Larynx.	Recurrence, died 2½ months.	Cleveland Medical Gazette, vol. viii., 1893.
30	Hubbard...	Dec., 1893.	M.	Carcinoma.	Larynx and glands.	Well, 2 months.	Trans. of the N. Y. Academy of Medicine, 1894.
31	Carmalt ...	March, 1894.	M.	Carcinoma.	Larynx.	Well, 4 months.	Trans. of the Third Congress of Physicians and Surgeons, Washington, 1894.
32	Landerer....	1877.	45.	Carcinoma.	Larynx.	Died, 4 months.	Baratoux, quoted by Pinçonnat.[1]
33	Chiarella....	1881.	44.	Carcinoma.	Larynx.	Recurrence, 4 mo.	
34	Maurer. ...	1882.	44.	Carcinoma.	Larynx.	Recurrence, 1 yr.	
35	Gottstein....	1884.	49.	Carcinoma.	Larynx.	Well. 3½ years.	
36	Kronlem	1885.	57.	Carcinoma.	Larynx.	Died, 1 month.	
37	Aguero.....	1886.	58.	Carcinoma.	Larynx.	Died.	
38	Bohner.	... .	.....	Carcinoma.	Larynx.	Died, 12 hours.	
39	Sokotowiski.	... .	.....	Carcinoma.	Larynx.	Died, 8 weeks.	
40	Chiarella....	.....	72.	Carcinoma.	Larynx.	Died, 8 months.	
41	Chiarella....	.....	65.	Carcinoma.	Larynx.	Died, 13½ mo.	
42	Chiarella....	1887.	54.	Carcinoma.	Larynx.	Died, 4 weeks.	
43	Pelechin. ...	....		Carcinoma.	Larynx.	Died, few days.	
44	Pelechin....	.....	.....	Carcinoma.	Larynx.	Died, few days.	
45	Pelechin....	....	.....	Carcinoma.	Larynx.	Died, few days.	
46	Pelechin. ...	.....	.....	Carcinoma.	Larynx.	Died, few days.	
47	Pelechin....	.....	.....	Carcinoma.	Larynx.	Died, 5 months.	
48	Hjorth. ...	April. 1889.	M. 62.	Sarcoma.	Larynx.	Well. 3 months.	

[1] These cases are taken, as others in the same list have been found to be authentic when investigated.

No.	Surgeon.	Date.	Sex & Age.	Diagnosis.	Parts Removed.	Course.	Source.
1	Koch[illegible]	June, 1885.	M. 44	Carcinoma.	Half of larynx.	Recurrence, 4 mo.	Archiv f. klin. Chir., Bd. XLIV., 1892.
2	Doyen.	May, 1887.	M. 41	Epithelioma.	Epiglottis, part of thyroid.	Recurrence, 9 mo.	Doyen. Extirpation du Larynx. Paris, 1892. Congrès français de Chir., 1888.
3	Koch[illegible]	Nov., 1887.	M. 51	Carcinoma.	Partial.	Well, 1 year.	Arch. f. klin. Chir., Bd. XLIV., 1892.
4	Koch[illegible]	Dec., 1888.	M. 62.	Sarcoma.	Partial.	Well, 4 years, to last record.	Arch. f. klin. Chir., Bd. XLIV., 1892.
5	Koch[illegible]	1888.	M. 67.	Tuberculosis.	Part of thyroid.	Died, 4 month.	Arch. f. klin. Chir., Bd. XLIV., 1892.
6	Pull[illegible]	March, 1888.	M. 50.	Carcinoma.	Half of larynx.	Recurrence, 1 mo.	Records of New York Hospital. 1888.
7	Pull[illegible]	June, 1888.	F. 40.	Sarcoma.	Half of larynx.	Well, 4 years.	Records of New York Hospital. 1888.
8	Mik[illegible]	[illegible]	[illegible]	Carcinoma.	Larynx.	Well, 1 year.	Communication to Soci[illegible] S. Swartz, Traitement du Larynx. Paris, 1889.
9	Koch[illegible]	Jan., 1890.	M. 56.	Carcinoma.	Thyroid cartilage, tongue, pharynx.	Recurrence, 1 yr. Heart failure. Pneumonia.	Arch. f. klin. Chir., Bd. XLIV., 1892.
10	Thiersch.	Feb., 1890.	F. 57.	Carcinoma.	Arytenoid, half thyroid.	Died, 1 days.	Journal American Medical Assn., vol. xiv., 1890.
11	Meyer.	Nov., 1890.	M. ?	Traumatism.	Half thyroid, part of cricoid and arytenoid.	Well, 3 years.	New York Medical Journal, vol. lviii., 1893.
12	Giles.	Dec., 1890.	M. 57.	Carcinoma.	Half of larynx.	Died, 24 hours.	Australia Medical Gazette, vol. xi., 1891.
13	Chavasse.	?	M. 3.	Traumatism.	Crushed, half thyroid.	Recovery.	Lancet, vol. ii., 1891.
14	Ashe.	1891.	M. 45.	Carcinoma.	More than half.	8 mo. Suspicious. Pneumonia.	Medical Record, vol. xlii., 1892.
15	Cohen.	1891.	M. 54.	Adeno-carcinoma.	Part of larynx.	Died, 48 hrs., recurrence.	New York Medical Journal, vol. lvi., 1892.
16	McBurney.	Oct., 1891.	M. 62.	Carcinoma.	Part of larynx.	Died, 4 months.	Roosevelt Hospital Records, 1891.
17	Munks.	May, 1892.	M. 30.	Carcinoma.	Half of thyroid.	Well over 2 years.	Trans. Am. Lar. Ass., vol. xiv., 1893, and personal communications.
18	McBurney.	Jan., 1892.	M. 54.	Carcinoma.	Half of larynx.	Died, 8 months.	Roosevelt Hospital Records, 1892.
19	Stimson.	Nov., 1892.	M. 36.	Carcinoma.	Part of larynx, and epiglot.	Died, 36 hours.	New York Hospital Records, 1892.
20	Stimson.	Oct., 1893.	M. 40.	Carcinoma.	Half of larynx.	Died, few hours.	New York Hospital Records, 1893.
21	Powers.	June, 1892.	M. 50.	Epithelioma.	Two-thirds of larynx.	Died, 6 mos., Recurrence.	Records of New York Cancer Hospital. (Present communication.)

Partial Laryngectomy for Cancer. (Table B, 2.)—Seventy-seven cases, of which 26, or thirty-three plus per cent., died during the first two months. Of the remaining 51, 7 cases, or thirteen per cent., are reported as "free" three or more years after operation. These cases are by Billroth, 3 years, 6 months; Stewart, 4 years; Schmidt, 4 years; Bergmann, 4 years; Solis-Cohen, 4 years, 3 months; Billroth, 4 years, 5 months; Küster, 8 years.

There remain the 10 cases subjected to operation during the past three years. (See Table C.)

It is worthy of note that in both the total and partial operations but two cases relapsed after the three-year limit had been passed, one at three years, four months, the other, Hahn's celebrated case, at the end of nine years.

It is more than probable that there are unrecorded fatal cases; it is not probable that there are many "cured" cases which have not been placed on record. So far as we can judge at present, however, we must accept these figures. Cases reported as "free" before the lapse of three years are of little value, except in that they diminish by so much the operative death-rate. And it would be of decided value if surgeons would divide their cases according to the extent of the disease. The writer (C. A. P.) has called attention to this on a previous occasion.[1]

It is obviously improper to include in the same category a case in which the cancerous process has progressed to the tissues outside the larynx and one in which there is a small intra-laryngeal epithelioma. In the one case there is no chance for cure, in the other a wide excision may offer a fair prospect of freedom from relapse.

In this way Kraus found that when the growth was confined to the larynx thirteen per cent. of the total

[1] On Cases Recently Admitted to the Surgical Service at the New York Cancer Hospital. New York Medical Journal, April 14, 1894.

operations and twenty per cent. of the partial were free from recurrence two or more years after removal. These percentages are based on the entire number of cases, deaths included, and are encouraging.

Of the operations for conditions other than carcinoma the following may briefly be said : There are 23 total laryngectomies. Sarcoma, 9—1 free at fifteen years ; 1 free at twenty months ; 1 free at three months ; 6 died soon after operation. One case each of polypus, cicatricial stenosis, myxo-chondroma and chronic laryngitis (?) survived. The remaining cases succumbed to the operation.

The partial laryngectomies are as follows : Sarcoma, 3 ; enchondroma, 2 ; tuberculosis, 3 ; stenosis (syphilis—trauma), 11. Total 19.

One sarcoma case is "cured" at end of four years, 1 enchondroma, 1 tuberculosis, and 8 stenosis cases are noted as cured. The remainder died.

These conditions are, however, minor—the major interest lies in carcinoma, and we may ask, "How is the laryngologist or the surgeon to advise his patient?" He may, perhaps, explain to him the conditions shown by the foregoing figures—the mortality-rate, the ratio of recurrences and of "cures." So far as we now know, the only hope for the cure of cancer lies in its excision. A palliative tracheotomy leaves the patient without hope, he is condemned to a torturing death.

Czerny avers that his patients who suffered excision but who had relapse were more comfortable than those who had no operation.

It was the fortune of the writers to see, in the early part of 1894, Solis-Cohen's remarkable case—a man whose entire larynx and upper trachea had been removed for cancer over two years before. The man was in good health, free from recurrence.

Monks, of Boston, in a recent letter says that his case of partial laryngectomy is well and free over

two years after operation. Such cases are worth scores of failures, if indeed the term "failure" can be applied in such an harassing and fatal affection. It is not so many years ago that surgeons advised against operation in cancer of the breast, while in a recent paper Bull[1] reports twenty-six per cent. free from relapse three to eight years after operation in all of his cases, unselected, and says that he feels that of the patients seen in the earliest stage of the disease fifty per cent. would come under the head of "cured."

It is not the purpose of the writers to strenuously advocate laryngectomy, but rather to make a plain statement of existing facts. Early diagnosis is of the greatest importance, and in many doubtful cases an exploratory thyrotomy will be found advantageous. It will be acknowledged, as said, that the only hope of cure, in cancer, lies in excision, and it is not irrational to expect that the progress which is constantly being made in the management of all forms of malignant disease will in due time enable us to record an increasing number of cases of cancer of the larynx free from relapse.

[1] MEDICAL RECORD, 1894.